

# What Is a Biome?

Earth is covered by many types of ecosystems. Ecologists group these ecosystems into larger areas known as biomes. A **biome** is a large region characterized by a specific type of climate and certain types of plants and animal communities. The map in **Figure 1.1** shows the locations of the world's major land, or terrestrial, biomes. In this chapter, you will take a tour through these terrestrial biomes—from lush rain forests to water-starved deserts and the frozen tundra. When you read about each biome, notice the adaptations the species that live there have to survive in each biome's very different environments.

## Biomes and Vegetation

Biomes are described by their vegetation because the plants that grow in a certain region are the most noticeable characteristics of that region. The plants, in turn, determine the other organisms that can live there. For example, mahogany trees grow in tropical rain forests because they cannot survive cold, dry weather. Organisms that depend on mahogany trees live where these trees grow.

Plants in a particular biome have adaptations that let them survive there. These adaptations include size, shape, and how they manage water. For example, plants that grow in the tundra tend to be short because they cannot obtain enough water to grow larger. They also have a short summer growing season. Desert plants, such as cactuses, have modified leaves. These specialized structures enable cactuses to conserve and retain water.


## SECTION 1

### Objectives

- Describe why vegetation is used to describe a biome.
- Explain how temperature and precipitation determine which plants grow in an area.
- Explain how latitude and altitude affect which plants grow in an area.

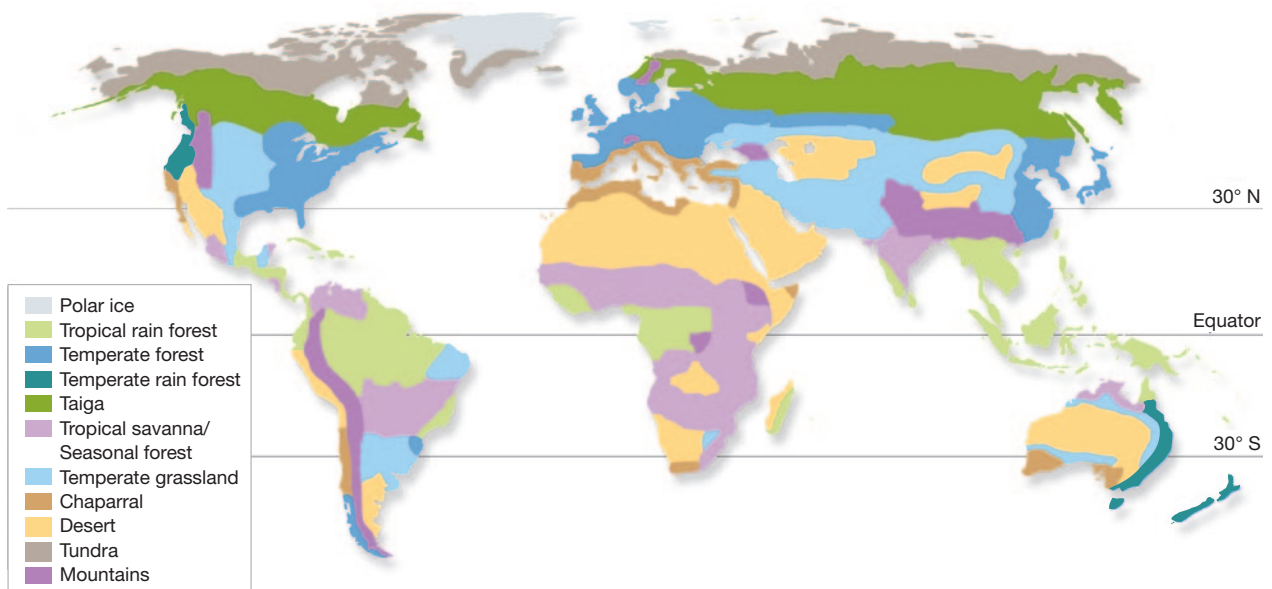
### Key Terms

biome  
climate  
latitude  
altitude

 **CHECK FOR UNDERSTANDING**  
**Explain** How are ecosystems related to biomes?

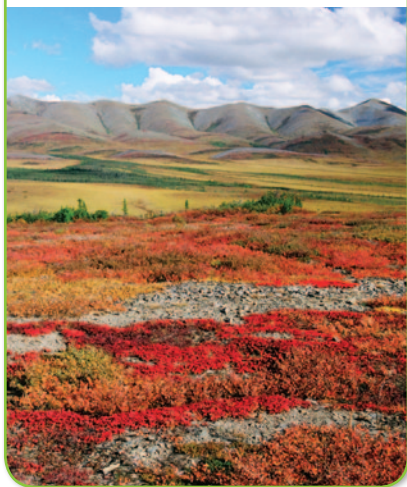
**FIGURE 1.1**

**Biome Map** The ecosystems of the world can be grouped into regions called biomes. These biomes, shown below, are named for the vegetation that grows there.



**FIGURE 1.2**

**Growing Season** Soil in the tundra is frozen most of the year. Small plants such as these have about two months in summer to grow and reproduce before temperatures become too cold again.



## Biomes and Climate

Biomes are defined by their plant life, but what factors determine which plants can grow in a certain area? The main factor is climate. **Climate** refers to the weather conditions, such as temperature, precipitation, humidity, and winds, that occur in an area over a long period of time. Temperature and precipitation are the two most important factors that determine a region's climate.

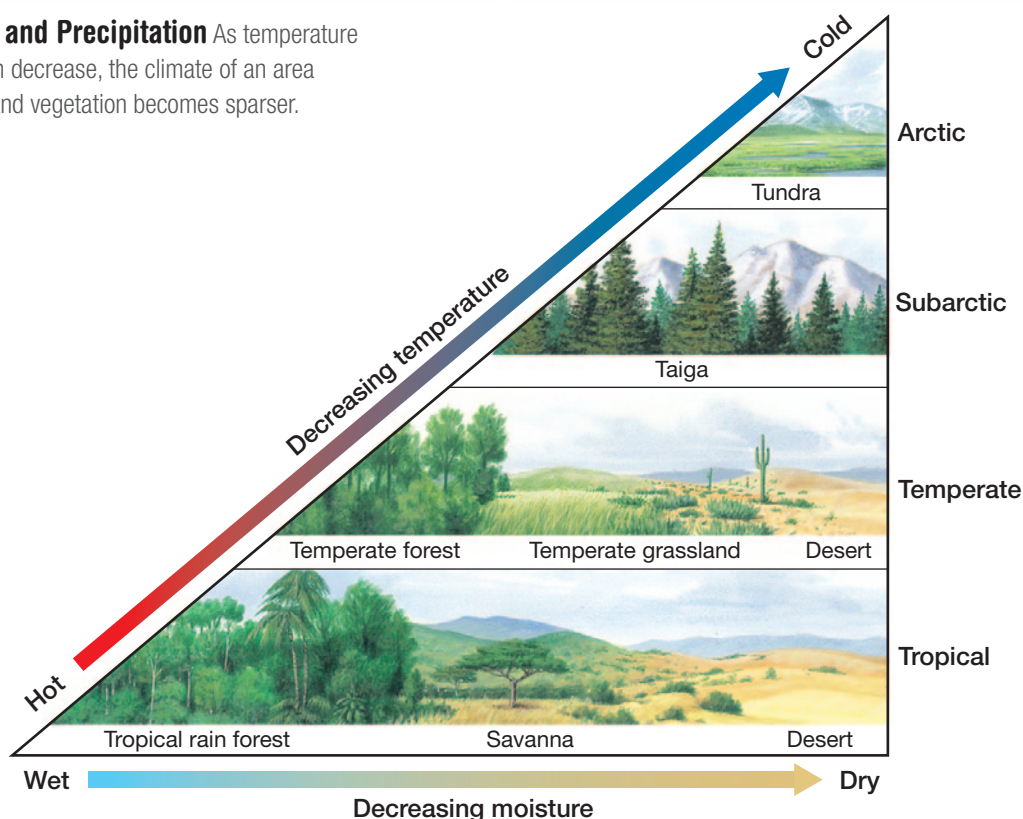
### Temperature and Precipitation

Most organisms are adapted to live within a certain range of temperatures and will not survive at temperatures too far outside of that range. The length of the growing season, or the period when temperatures are high enough for plants to grow, also affects plants, as shown in **Figure 1.2**.

Precipitation is another factor that limits the organisms that are found in a biome. All organisms need water. The larger an organism is, the more water it needs. For example, biomes that do not receive enough rainfall to support large trees support communities dominated by small trees, shrubs, and grasses. In biomes where rainfall is not frequent, the vegetation is mostly made up of cactuses and desert shrubs. In extreme cases, lack of rainfall results in no plants, no matter what the temperature is. As shown in **Figure 1.3**, the higher the temperature and precipitation are, the taller and denser the vegetation is. Notice how much more vegetation exists in a hot, wet tropical rain forest than in a dry desert.

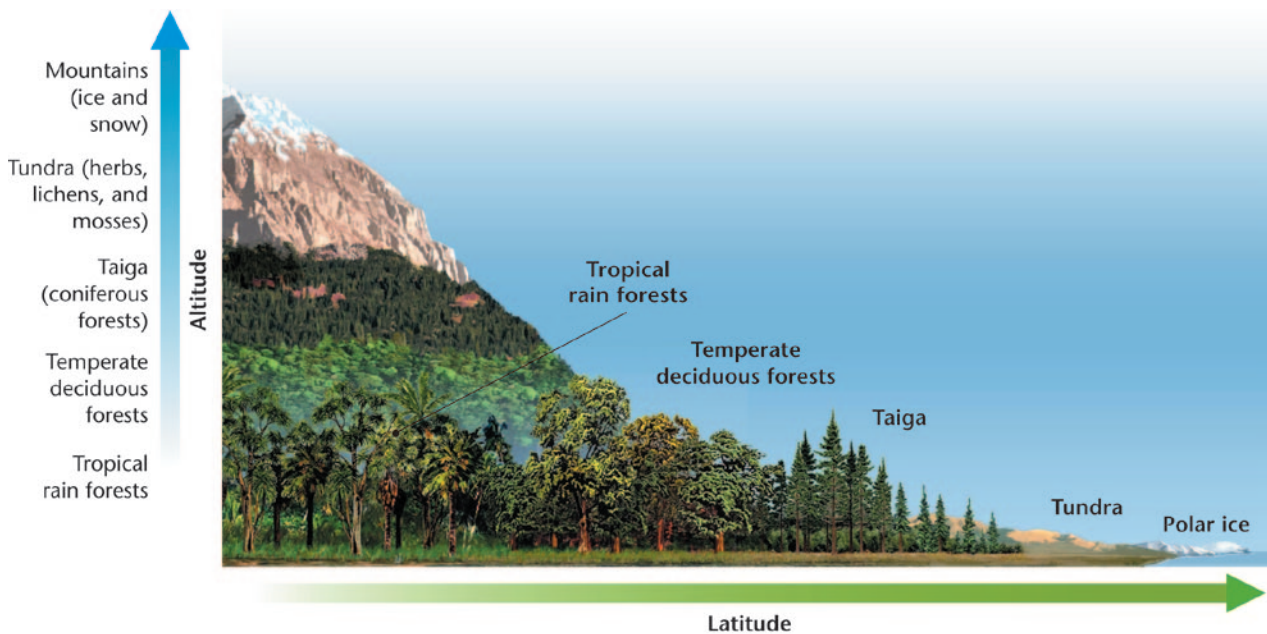
**FIGURE 1.3**

**Temperature and Precipitation** As temperature and precipitation decrease, the climate of an area becomes drier and vegetation becomes sparser.



**FIGURE 1.4**

**Latitude and Altitude** As latitude and altitude increase, biomes and vegetation change.



### Latitude and Altitude

Climate varies with both latitude and altitude, and so do biomes. **Latitude** is the distance north or south of the equator and is measured in degrees, with the equator equal to 0°. **Altitude** is the height of an object above sea level. Climate gets colder as either latitude or altitude increase. This explains why biomes at high altitudes are similar to those at high latitudes.

Figure 1.4 shows that as latitude and altitude increase, biomes and vegetation change. For example, the trees of tropical rain forests usually grow closer to the equator at low altitudes, while the mosses and lichens of the tundra usually grow closer to the poles. The land located in the temperate region, between about 30° and 60° north latitudes and 30° and 60° south latitudes, includes biomes such as temperate forests and grasslands, which usually have the moderate temperatures and fertile soil that are ideal for agriculture.



## Section 1 Formative Assessment

### Reviewing Main Ideas

1. **Describe** how plants determine the description of a biome.
2. **Explain** how temperature affects which plants grow in an area.
3. **Explain** how precipitation affects which plants grow in an area.
4. **Define** *latitude* and *altitude*. How is latitude different from altitude? How do these factors affect the organisms that live in a biome?

### Critical Thinking

5. **Making Inferences** The equator passes through the country of Ecuador. But the climate in Ecuador can range from hot and humid to cool and dry. Write a short paragraph that explains what might cause this range in climate.
6. **Analyzing Relationships** Look at Figure 1.1, and locate the equator and 30° north latitude. Which biomes are located between these two lines?